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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,517	06/08/2005	Michael A. V. Ward	6050 P58 US	4425

26486 7590 06/27/2006

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EXAMINER
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ALI, HYDER

ART UNIT	PAPER NUMBER
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3747

DATE MAILED: 06/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/511,517

Applicant(s)

WARD, MICHAEL A. V.

Examiner

HYDER ALI

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-13 is/are allowed.
- 6) ☒ Claim(s) 1,4-8,14-16 and 20 is/are rejected.
- 7) ☒ Claim(s) 2,3,17-19 and 21-23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1,4-8,14-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward (US 6,267,107) in view of Hoffmann et al (US 6,748,917).**

As to independent claims 1 and 20, Ward discloses an internal combustion engine for igniting, combusting, and expanding a burnt air-fuel mixture and producing work by means of a movable piston 5 within a cylinder that has a cylinder head 6 with intake and exhaust valve openings with the combustion chamber located mainly in the head, and further including squish lands for producing high squish-flow and turbulence as the piston 5 nears top center at the engine compression stroke, the system constructed and arranged to have one or more spark plugs 12a/118, 12b/118a positioned and oriented such that as the piston 5 approaches top center, intense air flow passes through the spark gap to move and spread the spark towards the center of the combustion chamber, the improvement comprising means for improving the lean burn capability of the engine under light load conditions and the knock rating under high loads wherein at least two plugs, each associated with coil both plugs being used and the two plug coil combinations have flexibility relative to each other in terms of ignition firing and timing such that the two spark plugs are controlled such that at light loads

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both plugs are fired (**inherently and necessarily present for two spark plugs engine**), and at some high load condition the plugs are fired independently, including situations wherein only one plug may be fired (**inherently and necessarily present for two spark plugs engine**).

Assuming Ward does not disclose selectively firing for high and low loads.

Hoffmann et al discloses a control unit 20 determines which spark plug 7,7' is to form a spark as a function of the load and the rpm of internal combustion engine 1, and it applies the positive potential of the ignition voltage to central electrode 16 of selected spark plug 7, 7'. If necessary, both spark plugs 7, 7' may also be used for ignition. **See col. 4, lines 9-15.**

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the invention of Ward by employing a control unit determines which spark plug is to form a spark as a function of the load as disclosed by Hoffmann et al. The motivation to do so would have been to provide Ward engine with a control unit selectively firing for high and low loads.

As to Claim 4, Ward discloses two spark plugs are used and wherein the two plugs have different spark gap widths.

As to Claim 5, Ward discloses the plug nearer the exhaust valve 8 has the smaller spark gap and is fired by itself at high loads, versus both being fired at light load (**inherently and necessarily present for two spark plugs engine**).

As to Claim 6, Ward discloses the fuel introduction means is essentially centrally located fuel injection means.

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As to Claim 7, Ward discloses one or more essentially radially outwards fuel injection sprays collide with squish land induced radially inwards squish flow.

As to Claim 8, Ward discloses at least one of one or more spark plugs are located at the edge of the squish zone with which the fuel injection spray interacts.

As to Claim 14, Ward discloses variable compression ratio means are provided, with high compression ratio at light loads and lower compression ratio at high loads.

As to Claim 15, Ward discloses variable compression means is achieved by having piston top, at the high compression condition, approach as close as practical to the cylinder head without hitting it, defining a very small squish clearance and very high flow, and having the piston further away at low compression ratio.

As to Claim 16, Ward discloses the high compression ratio is approximately 15 to 1.

### ***Allowable Subject Matter***

Claims 9-13 are allowed.

Claims 2,3,17-19 and 21-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

Applicant's arguments, see page 8, filed 4/25/06, with respect to the rejection(s) of claim(s) 1-20 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of

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rejection is made in view of Hoffmann et al. Hoffmann discloses a control unit 20 control spark plugs 7,7' as a function of load. See col. 4, lines 9-15.

**Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to HYDER ALI whose telephone number is (571) 272-4836. The examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Kirk Cronin can be reached on (571) 272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hyder Ali

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Stephen K. Cronin  
Primary Examiner  
SPES 747